REMARKS

This application pertains to novel process and apparatus for the catalytic treatment of dust and oxygen-containing exhaust gases which also contain sulfur and nitrogen oxides.

Claims 1-19 are pending, claims 16-19 being added by this amendment. Claims 13-15 have been withdrawn from consideration as drawn to non-elected subject matter, so that the claims under consideration are claims 1-12 and 16.

Applicants respectfully request that, upon the allowance of the claims drawn to the elected subject-matter, the claims drawn to the non-elected subject matter be rejoined.

In accordance with the novel process, the exhaust gases are treated in a catalyst-containing reactor, in the presence of one or more substances selected from the group consisting of free oxides, carbonates, hydroxides of calcium, magnesium, sodium and potassium under specified conditions, for the simultaneous desulfurization and denitrification without the formation of ammonium sulfate or ammonium hydrogen sulfate, wherein NO_x is decomposed to obtain N_2 and H_2O (page 2, 2nd and 3rd paragraphs).

The catalyst in the catalyst containing reactor is a solid catalyst with flow passages, in which the free opening surface of the catalyst is more than 50 % and in which the passages of the catalyst have a hydraulic diameter of more than 2 mm.

Surprisingly and unexpectedly the novel process is able to achieve a degree of denitrification of 95 % to 98 % and a degree of desulfurization of 80 % to 90 % while avoiding the formation of ammonium sulfate, ammonium hydrogen sulfate and sulfuric acid, despite the approximately stoichiometric operation of the NH_3/NO_x ratios (page 3, first full paragraph).

The free oxides, carbonates and/or hydroxides of calcium, magnesium, sodium and potassium which are present during the catalytic reaction are either present in or added to the exhaust gas prior to contact with the catalyst (page 4, third paragraph; page 7, third paragraph).

Claims 4-12 stand objected to for being in improper multiple dependent form. These claims have now been amended to proper dependent form, and the amendments are believed to overcome the objection. The objection should therefore now be withdrawn.

Claim 2 stands rejected under 35 U.S.C. 112, second paragraph, for reciting a broad range together with a narrow range. The claim has now been amended to recite only the broad range, and new claim 16 added to recite the narrower range. This rejection is thereby obviated, and should now be withdrawn.

Claims 1-3 stand rejected under 35 U.S.C. 103(a) as obvious over Inoue et al. (U.S. 4,221,768) in view of Graf et al. (U.S. 4,810,478). The Examiner points to part C of the Abstract of the Inoue et al. reference. The Examiner views this part of the Abstract as disclosing that Inoue's reactor may "comprise" oxides of alkali metals and alkaline metals.

In point of fact, however, the oxides of alkali metals and alkaline metals disclosed by Inoue are incorporated in the catalyst, and are not part of the exhaust gas stream being treated. Nowhere does Inoue teach or suggest including free oxides, carbonates or hydroxides of calcium, magnesium, sodium or potassium in the exhaust gas stream before bringing that stream into contact with the catalyst. In this regard, it should be noted that Inoue refers to his component C as "a catalytic oxide" (col. 2, line 37; col. 4, lines 29-45).

At col. 5, lines 23-38, Inoue discloses the "usual" composition of exhaust gases being treated by his catalyst. As the Examiner will see, nothing in the discussion of the exhaust gas composition even remotely suggests the inclusion of free oxides, carbonates or hydroxides of calcium, magnesium, sodium or potassium in the exhaust gas stream.

In addition, the Examiner acknowledges that Inoue does not disclose the operating conditions of the gas flow, but relies on Graff for a disclosure of a gas flow operating under specific Froude number conditions.

Operating the gas stream of the Inoue process under specific Froude number conditions will not in any way overcome the differences pointed out above, however. The Inoue process, even if operated under the conditions disclosed by Graff, will still be absent the inclusion of free oxides, carbonates or hydroxides of calcium, magnesium, sodium or potassium in the exhaust gas stream.

It is also to be noted that Graff is concerned with a fluidized bed process, whereas the present invention is concerned with a reactor that uses a solid catalyst. Thus, when Graff use carbonate reactants in his fluidized bed reactor, he provides for the addition of at least part of such reactants to the hot flue gas stream within the waste heat boiler (col. 4, lines 52-57). This, however, is a method of supplying the reactants to the fluidized bed reactor, and would not in any way suggest the addition of any materials to an exhaust gas stream being treated in a reactor having a solid catalyst. Stated differently, the addition of Graff's carbonate reactant to the flue gas stream is a way of adding "make up" reactant to the fluidized bed reactor. In the absence of a fluidized bed, there would be no purpose for adding such to the flue gas stream.

Accordingly, no combination of the Inoue and Graff references could possibly lead to Applicants' novel process, and the rejection of Claims 1-3 under 35 U.S.C. 103(a) as obvious over Inoue et al. (U.S. 4,221,768) in view of Graf et al. (U.S. 4,810,478) should now be withdrawn.

In view of the present remarks it is believed that claims 1-19 are now

in condition for allowance. Reconsideration of said claims by the Examiner is respectfully requested and the allowance thereof is courteously solicited.

CONDITIONAL PETITION FOR EXTENSION OF TIME

If any extension of time for this response is required, Appellants request that this be considered a petition therefor. Please charge the required petition fee to Deposit Account No. 14-1263.

ADDITIONAL FEE

Please charge any insufficiency of fee or credit any excess to Deposit Account No. 14-1263.

Respectfully submitted,
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I hereby certify that this correspondence is being transmitted via facsimile, no (703) 872-9306, to the United States Patent and Trademark Office, addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on December 22, 2004.

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